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IC - A61B17/58

PA - (NARU-I) NARUSHIMA M

PN - JP8322848 A 19961210 DW199708 A61B17/58 004pp

PR - JP19950135285 19950601

XIC - A61B-017/58

XP - N1997-067397

AB - J08322848 The screw unit comprises a lag screw (10) and a sleeve (20).

The lag screw is formed with a spiral thread (11) at the free end and a collar (12) at the other end. A compression coil spring (17) is installed inbetween the collar and the washer of lag screw. The sleeve is formed with a through hole (22) along the axial direction and a male thread part on the periphery. At the end of the through hole, a flange (23) is formed, through which the lag screw is inserted.

- The male thread part of the sleeve is screwed into one side of the broken part and the lag screw is inserted into it. The spiral thread is secured to the broken part. As the tightening is increased, the collar of the lag screw compresses against the spring. Now the spring provides directional elastic force for drawing the lag screw inside the sleeve.

- **ADVANTAGE** - Prevents loosening of lag screw. Enables usage of several sizes of lag screw.

- (Dwg.2/5)

IW - SCREW UNIT FRACTURE PART FIX COMPRESS COIL SPRING INSTALLATION COLLAR WASHER LAG SCREW DIRECTION ELASTIC FORCE DRAW SLEEVE

IKW - SCREW UNIT FRACTURE PART FIX COMPRESS COIL SPRING INSTALLATION COLLAR WASHER LAG SCREW DIRECTION ELASTIC FORCE DRAW SLEEVE

NC - 001

OPD - 1995-06-01

ORD - 1996-12-10

PAW - (NARU-I) NARUSHIMA M

TI - Screw unit for fracture parts fixation - has compression coil spring installed between collar and washer of lag screw providing directional elastic force for drawing inside sleeve

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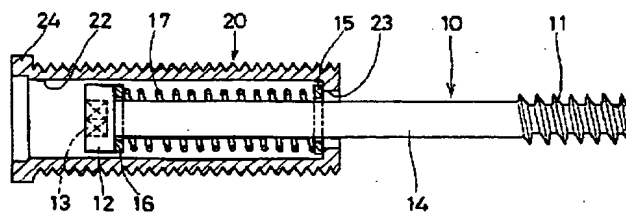
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(54)【発明の名称】 骨折部固定用スクリュー装置

(57)【要約】

【目的】 骨折部の固定圧着にゆるみが生じない固定用スクリュー装置を提供することである。

【構成】 一端部にらせん突条11を有するラグスクリュー10と、このラグスクリュー10の他端部が挿入されたスリーブ20より成り、前記ラグスクリュー10のカラー12とワッシャー15との間に圧縮コイルバネ17を取り付け、ラグスクリュー10がスリーブ20内に引き込まれる方向に弾性を付与したのである。



【特許請求の範囲】

【請求項 1】 一端部にらせん突条を有するラグスクリューと、このラグスクリューの他端部が挿入されたスリーブより成り、前記ラグスクリューとスリーブとの間に、ラグスクリューをスリーブ内に引き込む方向の弾性を付与する弾性部材を介在させた骨折部固定用スクリュー装置。

【請求項 2】 前記ラグスクリューが前記スリーブに挿入・引き出し自在となっており、前記スリーブの他端部には弾性部材が外嵌され、この弾性部材の一端はスリーブの一端に、弾性部材の他端はラグスクリューの他端に限定されて、ラグスクリューをスリーブ内に引き込む方向に弾性を付与するようになっていて特徴とする請求項 1 記載の骨折部固定用スクリュー装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 この発明は、骨折部を固定するスクリュー装置に関する。

【0002】

【従来の技術】 例えば大腿骨の大転子が骨折した場合、図 4 に示すようなスクリュー装置が用いられる。この装置は、ラグスクリュー 1、支持アーム 2、スリーブ 3、締付スクリュー 4、セットビス 5、固定スクリュー 6 から成り、図 5 に示すように、大腿骨 7 に支持アーム 2 を縦に挿入し、ラグスクリュー 1 を支持アーム 2 の斜孔 2a に通して大転子 7 から骨折部 9 を介して骨頭 8 にねじ込み、さらにスリーブ 3 をラグスクリュー 1 の後端部に外挿し、セットビス 5 を支持アーム 2 の上端からねじ込んでスリーブ 3 を固定する。そして締付スクリュー 4 をラグスクリュー 1 のねじ孔 1a (図 4) にねじ込み、ラグスクリュー 1 をスリーブ 3 内に引き込み、骨折部 9 を密着させる。最後に固定スクリュー 6 をねじ込んでアーム 2 を固定する。

【0003】

【発明の課題】 ところが、上記骨折部 9 をラグスクリュー 1 と締付スクリュー 4 によって圧着させる際に、不正確な固定や強すぎる固定などが生じると、骨折部周辺に血行障害や圧迫による骨壊死が生じ、固定のゆるみの原因となり、骨癒合遅延、骨癒合不全、偽関節などが生じる。

【0004】 そこで、この発明の課題は、骨折部の固定・圧着にゆるみが生じないようにしたスクリュー装置を提供することである。

【0005】

【課題の解決手段】 上記の課題を解決するために、この発明の固定装置は、一端部にらせん突条を有するラグスクリューと、このラグスクリューの他端部が挿入されたスリーブより成り、前記ラグスクリューの他端部とスリーブとの間に、ラグスクリューをスリーブに引き込む方向に弾性を付与する弾性部材を介在させたことを特徴と

する。

【0006】

【作用】 骨の骨折部にまたがるようにラグスクリューを挿入し、スリーブを骨折部の一方に固定し、かつ弾性部材を圧縮するようにラグスクリューを調節しておくこと、ラグスクリューはスリーブに引き込まれるように偏向されるため、骨折部には常に圧着力が作用してゆるみが生じない。

【0007】

【実施例】 以下、この発明の実施例を添付図面に基づいて説明する。

【0008】 図 1 に示すように、この発明のスクリュー装置は、ラグスクリュー 10 とスリーブ 20 より成り、ラグスクリュー 10 の先端部には、比較的高いらせん突条 11 が設けられ、後端にはカラー 12 が設けられており、このカラー 12 の端面には、六角レンチやスクリュードライバを係合できる六角孔やプラス孔などの凹部 13 が設けられている。また、ラグスクリュー 10 のシャフト 14 には、ワッシャー 15、16 が嵌め合され、このワッシャー 15、16 間に圧縮コイルバネ 17 が取り付けられている。このコイルバネ 17 に代えて、複数の皿バネやゴムスリーブなどの弾性を有する部材を用いることができる。

【0009】 前記スリーブ 20 には、外周にらせん突条 21 が設けられており、内部の貫通孔 22 は、前記ラグスクリュー 10 の突条 11、ワッシャー 15、16、カラー 12 を挿入できる径を有するが、先端には内側方向のフランジ 23 が設けられ、このフランジ 23 の内径は、らせん突条 21 より大でワッシャー 15 よりも小になっている。なお、スリーブ 20 の後端にカラー 24 を設け、このカラー 24 を例えば六角形にして工具でスリーブ 20 を回転し易くしておくことができる。

【0010】 図 2 は、前記ラグスクリュー 10 をスリーブ 20 に挿入した状態を示す。図示のように、ラグスクリュー 10 に嵌挿したワッシャー 15 がスリーブ 20 のフランジ 23 よりも大径になっているため、フランジ 23 がストッパーとなってラグスクリュー 10 の右側方向に抜け止めされる。

【0011】 図 3 に示すように、上記のようなスクリュー装置を例えば大腿骨頸部 30 の骨折部 31 に使用する場合には、まず骨折部 31 にまたがって下穴を設け、スリーブ 20 を固定した後、その中にラグスクリュー 10 を挿入し、回転させながららせん突条 11 によって所定位置まで進入させる。このとき同時にコイルバネ 17 を圧縮させる。これによって骨折部 31 の右側の骨片は、骨折部 31 に圧着される。そのため、骨折部 31 に圧壊などが生じて骨折部 31 がゆるむことがない。また、ワッシャー 15、16 とスリーブ 20 の貫通孔 22 との間、シャフト 14 とワッシャー 15、16 との間、カラー 12 と貫通孔 22 との間等のいずれか又は二者以上の

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間に多少の間隙を設けておくと、ラグスクリュー 10 がスリーブ 20 に対して半径方向のガタを有するため、骨折部 31 に部分的なゆりみの原因が生じてもコイルバネ 17 の弾性が作用して、部分的なゆりみも吸収することができる。

【0012】なお、この発明のスクリュー装置を例えば図 4 及び図 5 に示すような支持アーム 2 と共に用いることができる。

【0013】また、この発明のスクリュー装置は、大転子部や膝関節の骨折ばかりでなく、他の部分に用いることができる。

【0014】さらに、骨格の大きさや骨折部位等に応じて、ラグスクリュー 10 とスリーブ 20 のサイズを幾種類か用意しておき、適宜選択して用いることができる。

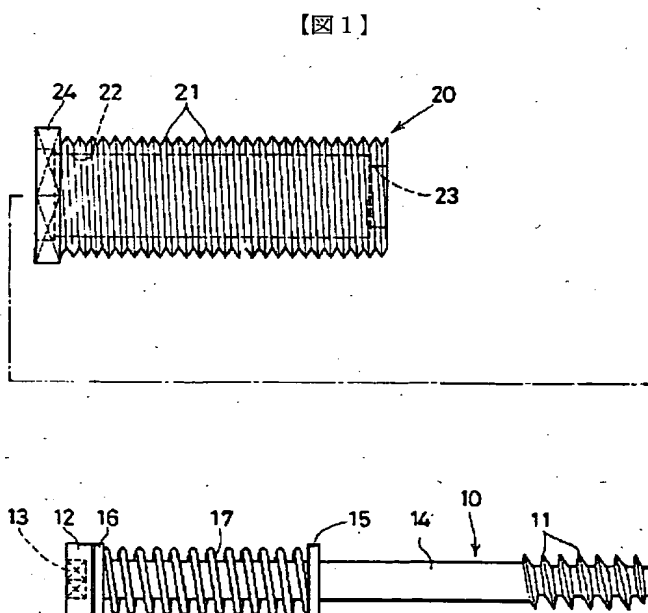
【0015】

【効果】この発明によれば、以上のように、ラグスクリューをスリーブ方向に引き込む弾性部材を設けたので、骨折部にまたがってラグスクリューを取り付けると、骨折部は弾性的に圧着されるため、骨折部にゆりみが生じるような原因があっても、このゆりみを防止することができる。

【0016】また、ラグスクリューに予め弾性部材を装着しておき、ラグスクリューをスリーブ内に挿入着脱可能にしたので、何種類かのサイズのスクリュー及びスリーブを用意しておくことによって、骨格や骨折部位に対応した治療が可能となる。

【図面の簡単な説明】

【図 1】この発明のスクリュー装置の一例を示す分解側面図



【図 1】

4

【図 2】同上の組立て縦断面図

【図 3】同上の使用状態を示す断面図

【図 4】従来のスクリュー装置を示す分解側面図

【図 5】同上の使用状態を示す側面図

【符号の説明】

1 ラグスクリュー

1a ねじ孔

2 支持アーム

2a 斜孔

3 スリーブ

4 締付スクリュー

5 セットビス

7 大転子

8 骨頭

9 骨折部

10 ラグスクリュー

11 らせん突条

12 カラー

13 凹部

14 シャフト

15、16 ワッシャー

17 コイルバネ

20 スリーブ

21 らせん突条

22 貫通孔

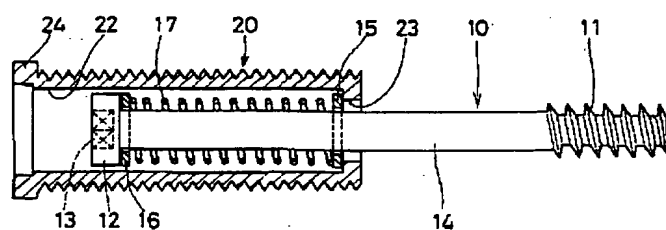
23 フランジ

24 カラー

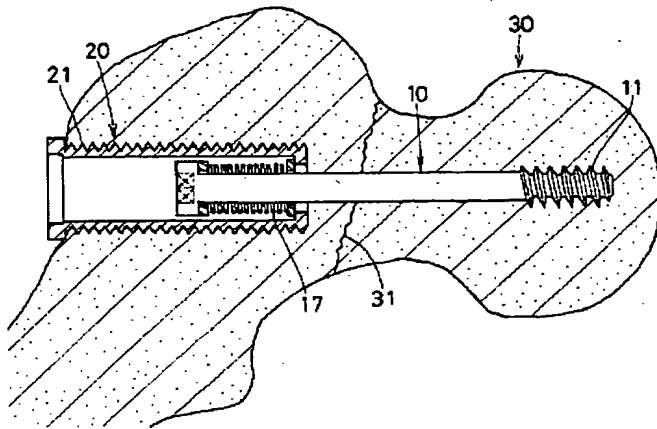
30 大腿骨頭部

31 骨折部

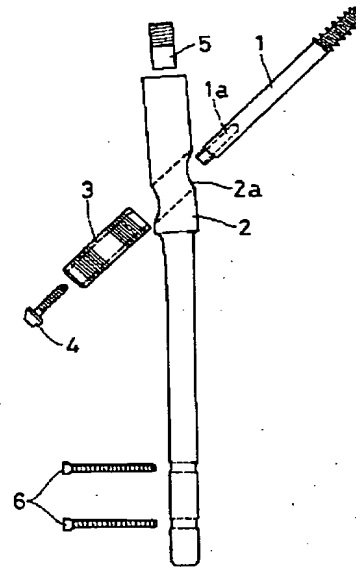
【図 2】



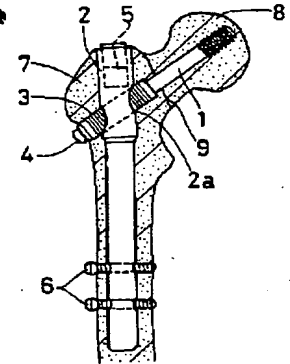
【図3】



【図4】



【図5】



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CLAIMS

[Claim(s)]

[Claim 1] Screw equipment for fracture section immobilization between which the elastic member which gives the elasticity of the direction which consists of the sleeve by which the other end of the lag screw which has a whorl protruding line, and this lag screw was inserted in the end section, and draws a lag screw in a sleeve between said lag screws and sleeves was made to be placed.

[Claim 2] It is screw equipment for fracture section immobilization according to claim 1 characterized by the insertion and the drawer of said lag screw having become free at said sleeve, and an elastic member being attached outside by the other end of said sleeve, and limiting the end of this elastic member to the end of a sleeve, limiting the other end of an elastic member to the other end of a lag screw, and giving elasticity in the direction which draws a lag screw in a sleeve.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the screw equipment which fixes the fracture section.

[0002]

[Description of the Prior Art] For example, when the trochanter major of a femur suffers a fracture, screw equipment as shown in drawing 4 is used. As this equipment consists of a lag screw 1, the support arm 2, a sleeve 3, the screw 4 with a bundle, the set screw 5, and a securing screw 6 and is shown in drawing 5 Insert the support arm 2 in a femur 7 perpendicularly, and it thrusts into the condyle 8 through the fracture section 9 at slant hole 2a of the support arm 2 through a lag screw 1 from the trochanter major 7. Furthermore, a sleeve 3 is extrapolated in the back end section of a lag screw 1, the set screw 5 is screwed in from the upper bed of the support arm 2, and a sleeve 3 is fixed. And the screw 4 with a bundle is thrust into screw-thread hole 1a (drawing 4) of a lag screw 1, a lag screw 1 is drawn in a sleeve 3, and the fracture section 9 is stuck. Finally a securing screw 6 is thrust and an arm 2 is fixed.

[0003]

[Problem(s) to be Solved by the Invention] However, if inaccurate immobilization, too strong immobilization, etc. arise in case the above-mentioned fracture section 9 is made to stick by pressure on a lag screw 1 and the screw 4 with a bundle, the osteonecrosis by the interruption in the circulation or pressure arises around the fracture section, it will become the cause of looseness of immobilization and synostosis delay, synostosis incompetence, pseudoarticulation, etc. will arise.

[0004] Then, the technical problem of this invention is providing immobilization and sticking by pressure of the fracture section with the screw equipment it was made for looseness not to produce.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the locking device of this invention consists of the sleeve by which the other end of the lag screw which has a whorl protruding line, and this lag screw was inserted in the end section, and is characterized by making the elastic member which gives elasticity intervene in the direction which draws a lag screw in a sleeve between the other end of said lag screw, and a sleeve.

[0006]

[Function] If the lag screw is adjusted so that a lag screw may be inserted so that the

bony fracture section may be straddled, a sleeve may be fixed to one side of the fracture section and an elastic member may be compressed, since a lag screw is deflected so that it may be drawn in a sleeve, the sticking-by-pressure force will always act on the fracture section, and looseness will not produce it.

[0007]

[Example] Hereafter, the example of this invention is explained based on an accompanying drawing.

[0008] As shown in drawing 1, the screw equipment of this invention consists of a lag screw 10 and a sleeve 20, the comparatively high whorl protruding line 11 is formed, the color 12 is formed in the back end, and the crevices 13 which can be engaged in a hexagonal wrench or a screw driver, such as a hexagon-head hole and a plus hole, are established in the point of a lag screw 10 at the end face of this color 12. Moreover, washers 15 and 16 are inserted in the shaft 14 of a lag screw 10, and the compression spring 17 is attached between this washer 15 and 16. It can replace with this coil spring 17, and the member which has elasticity, such as two or more pan springs and a sealing sleeve, can be used.

[0009] The whorl protruding line 21 is formed in the periphery at said sleeve 20, although the internal breakthrough 22 has the path which can insert the protruding line 11 of said lag screw 10, washers 15 and 16, and a color 12, the flange 23 of the direction of the inside is formed at a head, and the bore of this flange 23 has become smallness from the whorl protruding line 21 rather than the washer 15 in size. In addition, a sleeve 20 can be made easy to form a color 24 in the back end of a sleeve 20, to use this color 24 as a hexagon, and to rotate by the tool.

[0010] Drawing 2 shows the condition of having inserted said lag screw 10 in the sleeve 20. Since the washer 15 fitted in the lag screw 10 is a major diameter from the flange 23 of a sleeve 20 like a graphic display, a flange 23 serves as a stopper, and a stop is escaped from and carried out to the right side direction of a lag screw 10.

[0011] A lag screw 10 is inserted into it, and it is made to advance to a predetermined location by the whorl protruding line 11, after preparing a prepared hole ranging over the fracture section 31 first and fixing a sleeve 20, in using the above screw equipments for the fracture section 31 of a femoral neck 30 as shown in drawing 3, making it rotate. A coil spring 17 is made to compress into coincidence at this time. The spicule on the right-hand side of the fracture section 31 is stuck to the fracture section 31 by this by pressure. Therefore, even if collapse etc. arises in the fracture section 31, the fracture section 31 does not loosen. Moreover, if some gaps are prepared between a shaft 14 and washers 15 and 16 between washers 15 and 16 and the breakthrough 22 of a sleeve 20 between either between a color 12 and a breakthrough 22 etc., or two persons or more Since a lag screw 10 has radial backlash to a sleeve 20, even if the cause of partial looseness arises in the fracture section 31, the elasticity of a coil spring 17 can act, and partial looseness can also be absorbed.

[0012] In addition, the screw equipment of this invention can be used with the support arm 2 as shown in drawing 4 and drawing 5.

[0013] Moreover, the screw equipment of this invention can be used not only for fracture of the trochanter-major section or a knee joint but for other parts.

[0014] Furthermore, according to magnitude, a fracture part, etc. of a frame, some kinds of sizes of a lag screw 10 and a sleeve 20 are prepared, and it can choose suitably and can use.

[0015]

[Effect] Since the elastic member which draws a lag screw in the direction of a sleeve was prepared as mentioned above according to this invention, if a lag screw is attached ranging over the fracture section, since the fracture section is stuck by pressure elastically, even if it has the cause which looseness produces in the fracture section, it can prevent this looseness.

[0016] moreover, a lag screw -- beforehand -- an elastic member -- equipping -- a lag screw -- the inside of a sleeve -- insertion -- since it was made removable, the therapy corresponding to a frame or a fracture part is attained by preparing how many kinds of the lag screw and sleeve of that size.

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TECHNICAL FIELD

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PRIOR ART

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the locking device of this invention consists of the sleeve by which the other end of the lag screw which has a whorl protruding line, and this lag screw was inserted in the end section, and is characterized by making the elastic member which gives elasticity intervene in the direction which draws a lag screw in a sleeve between the other end of said lag screw, and a sleeve.

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OPERATION

[Function] If the lag screw is adjusted so that a lag screw may be inserted so that the bony fracture section may be straddled, a sleeve may be fixed to one side of the fracture section and an elastic member may be compressed, since a lag screw is deflected so that it may be drawn in a sleeve, the sticking-by-pressure force will always act on the fracture section, and looseness will not produce it.

[Translation done.]

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EXAMPLE

[Example] Hereafter, the example of this invention is explained based on an accompanying drawing.

[0008] As shown in drawing 1, the screw equipment of this invention consists of a lag screw 10 and a sleeve 20, the comparatively high whorl protruding line 11 is formed, the color 12 is formed in the back end, and the crevices 13 which can be engaged in a hexagonal wrench or a screw driver, such as a hexagon-head hole and a plus hole, are established in the point of a lag screw 10 at the end face of this color 12. Moreover, washers 15 and 16 are inserted in the shaft 14 of a lag screw 10, and the compression spring 17 is attached between this washer 15 and 16. It can replace with this coil spring 17, and the member which has elasticity, such as two or more pan springs and a sealing sleeve, can be used.

[0009] The whorl protruding line 21 is formed in the periphery at said sleeve 20, although the internal breakthrough 22 has the path which can insert the protruding line 11 of said lag screw 10, washers 15 and 16, and a color 12, the flange 23 of the direction of the inside is formed at a head, and the bore of this flange 23 has become smallness from the whorl protruding line 21 rather than the washer 15 in size. In addition, a sleeve 20 can be made easy to form a color 24 in the back end of a sleeve 20, to use this color 24 as a hexagon, and to rotate by the tool.

[0010] Drawing 2 shows the condition of having inserted said lag screw 10 in the sleeve 20. Since the washer 15 fitted in the lag screw 10 is a major diameter from the flange 23 of a sleeve 20 like a graphic display, a flange 23 serves as a stopper, and a stop is escaped from and carried out to the right side direction of a lag screw 10.

[0011] A lag screw 10 is inserted into it, and it is made to advance to a predetermined location by the whorl protruding line 11, after preparing a prepared hole ranging over the fracture section 31 first and fixing a sleeve 20, in using the above screw equipments for the fracture section 31 of a femoral neck 30 as shown in drawing 3, making it rotate. A coil spring 17 is made to compress into coincidence at this time. The spicule on the right-hand side of the fracture section 31 is stuck to the fracture section 31 by this by pressure. Therefore, even if collapse etc. arises in the fracture section 31, the fracture section 31 does not loosen. Moreover, if some gaps are prepared between a shaft 14 and washers 15 and 16 between washers 15 and 16 and the breakthrough 22 of a sleeve 20 between either between a color 12 and a breakthrough 22 etc., or two persons or more Since a lag screw 10 has radial backlash to a sleeve 20, even if the cause of partial looseness arises in the fracture section 31, the elasticity of a coil spring 17 can act, and partial looseness can also be absorbed.

[0012] In addition, the screw equipment of this invention can be used with the support arm 2 as shown in drawing 4 and drawing 5 .

[0013] Moreover, the screw equipment of this invention can be used not only for fracture of the trochanter-major section or a knee joint but for other parts.

[0014] Furthermore, according to magnitude, a fracture part, etc. of a frame, some kinds of sizes of a lag screw 10 and a sleeve 20 are prepared, and it can choose suitably and can use.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The decomposition side elevation showing an example of the screw equipment of this invention

[Drawing 2] Assembly drawing of longitudinal section same as the above

[Drawing 3] The sectional view showing a busy condition same as the above

[Drawing 4] The decomposition side elevation showing conventional screw equipment

[Drawing 5] The side elevation showing a busy condition same as the above

[Description of Notations]

1 Lag Screw

1a Screw-thread hole

2 Support Arm

2a Slant hole

3 Sleeve

4 Screw with Bundle

5 Set Screw

7 Trochanter Major

8 Condyle

9 Fracture Section

10 Lag Screw

11 Whorl Protruding Line

12 Color

13 Crevice

14 Shaft

15 16 Washer

17 Coil Spring

20 Sleeve

21 Whorl Protruding Line

22 Breakthrough

23 Flange

24 Color

30 Femoral Neck

31 Fracture Section

[Translation done.]

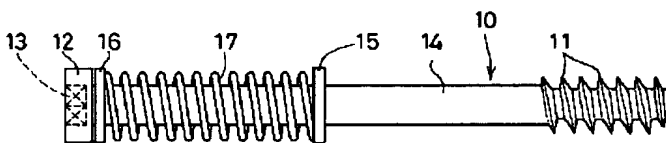
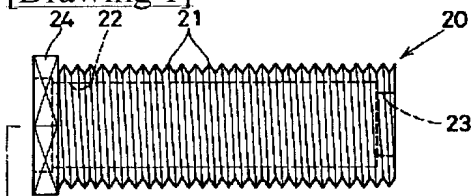
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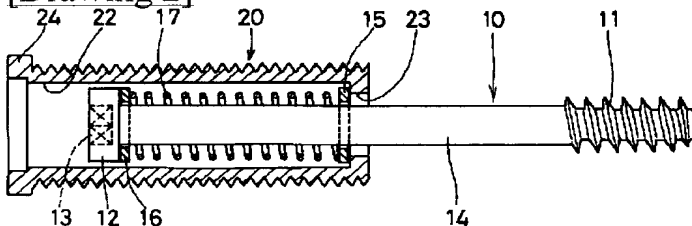
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DRAWINGS

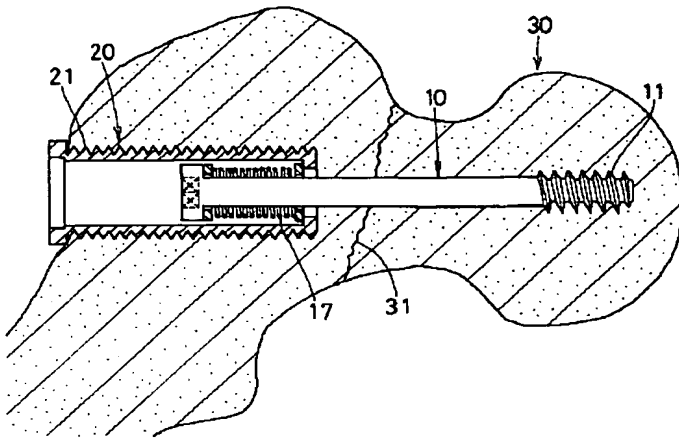
[Drawing 1]



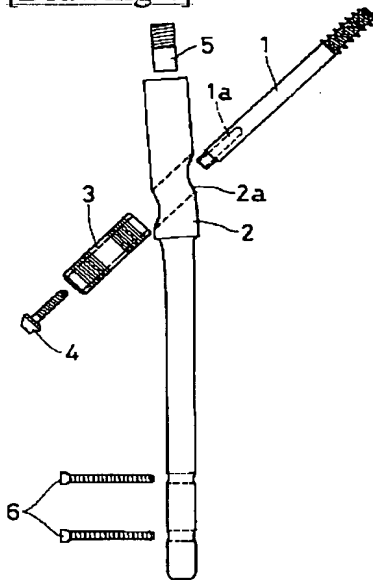
[Drawing 2]



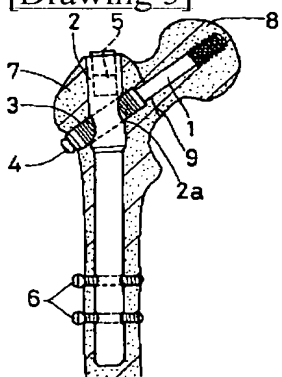
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]